

## **METHOD AND APPARATUS FOR FILLING SYRINGES**

**INVENTOR: NILES CLARK**

### **STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENTS**

**Not Applicable**

### **REFERENCE TO A MICROFICHE APPENDIX: Not Applicable**

5

### **BACKGROUND OF THE INVENTION.**

#### **1. Field of the Invention**

This invention relates generally to an apparatus and method for providing interchangeable syringe guides to improve in the accuracy and simplicity of administering home medication through a hypodermic syringe.

#### **2. Description of the Related Art**

The present invention is an article which greatly improves the accuracy of administering home medication with a hypodermic syringe. An apparatus and method are provided whereby greatly improved interchangeable syringe guides are set forth, achieving a significant comfort and medical improvement for many individuals. The article is comprised of a holder for a syringe bottle and a guide for insertion of the syringe into the bottle top. The apparatus include a series of interchangeable syringe guides corresponding to different sizes for differing doses of medication or types of medication. In another alternative, the apparatus may include a single syringe anchoring block with multiple size guides integrated therein.

As a result of a re-occurring or permanent medical condition, many individuals need to administer medication in the home through the use of hypodermic syringes. For example, people who are diabetic need insulin usually several times a day. The consequences of not receiving

insulin at a prescribed time can be very serious or life threatening. In addition, many individuals need to take daily allergy medications or receive intravenous medicine for pain or other ailments.

25 In taking intravenous medication at home, great care and precision must be taken in the loading of the syringe and administration of the medicine.

Although home administration of medication through hypodermic syringes is quite common, it is a difficult and painful experience for many people. Arthritis, advanced age, and poor finger dexterity make syringe loading a difficult challenge for many individuals. As a 30 result, many individuals are reliant on the assistance of others to help load the syringe. This could lead to a life threatening situation if the patient should find him or herself alone and needing to take the medication.

Another group of individuals who are greatly challenged in home hypodermic treatment are the blind and those suffering from poor eyesight. Not only does lining up the needle and 35 bottle present a challenge, but also the identification of how much medication is being loaded in the syringe is problematic. The present invention assists in lining up the syringe with the medicine vial and the insertion of the syringe as well as identification of markings and location of the plunger. In addition to hypodermic syringes, the present invention can be used with other syringes such as those customarily used in insulin pumps.

40 Since home administration of hypodermic shots is not uncommon, there are an assortment of prior patents in this field. The invention claimed in these patents range from smaller items that fit over the syringe alone to sizeable items that are capable of receiving the syringe and the medicine vial. Some of the latter may have means for covering and retaining the syringe and vial and may even have provisions for being mounted to a fixed surface.

45 One of the closest prior art patents found is U.S. Patent 6,364,866 by Furr et al. Furr

discloses a guide for filling a syringe comprising a base having a cavity for receiving a syringe and a cavity for receiving the medicine vial, tensioners to assist in holding the syringe, and a cover which fits onto the base and covers the vial and syringe. Both cavities extend inwardly from their respective ends of the guide to a central location where they are aligned, allowing  
50 access to a vial by a syringe. The cavity for the vial is shaped to accommodate at least a part of the vial and is shaped at its central end to receive the vial neck and top with an interference fit to positively hold the vial in place during use. The cavity for the syringe is shaped to accommodate a substantial portion of the barrel of the syringe and is positioned so as to longitudinally align the syringe with the vial. The cover is as long as the two cavities and is essentially semi-circular  
55 along its length. The cover has cavities basically matching those in the base, and it has L-shaped flanges along its bottom edges which match L-shaped grooves in the base. Integral to the cover top is a magnifying effect due to the shape and material of the cover. The cover is attached to the base by sliding it into the grooves from the vial end of the base. The grooves do not run the entire length of the base so the cover may be extended past the syringe end of the base but cannot  
60 pass all the way through the base. Along each side of the syringe cavity is a tensioner which bows out slightly into the cavity.

U.S. Patent 6,581,648 by Zolentruff et al., also has flexible members to accommodate different sizes of syringes. The syringe guide region initially has only a curved bottom surface that contacts the syringe, then transitions to a section with a bottom and two mostly vertical sides having curved surfaces. These vertical curved members are flexible and can accommodate different size syringes. This initial section may be followed by a second portion having alignment arms. These flex and align the syringe similar to the initial section. Along with accommodating different sizes of syringes, Zolentroff uses a similar approach to accommodate

different sizes of medicine vials. Along the sides of the medicine vial, retaining portions of the  
70 Zolentroff article are flexible, curved centering arms. As with the others, these members flex to accommodate different diameters. The friction of the flexible members is the means of retaining the syringe when the plunger is withdrawn to fill the syringe. The top of the device is at least partially open along the length of the syringe and vial.

U.S. Patent 5,894,870 by Maxwell also features a syringe holder. Maxwell has a trough with three sides for the syringe and a cavity to accommodate the vial with a transition neck between the two. The transition neck is fitted to the vial cap and the cap snaps into place to retain the vial during use. The syringe slides in the trough to insert the needle. The side of the trough opposite the syringe has a magnifying effect that makes the syringe markings easier to read. Quite similar to Maxwell is U.S. Patent 4,475,915 by Sloane, which uses a partially open cylindrical section with one closed end to hold the medicine vial and a magnifying member extending from the closed end. At the free end of the magnifying member, a syringe support is located with this syringe support in alignment with a hole in the closed end and the vial. The magnifying member increases visibility of a syringe placed in the guide and penetrating the vial. Both Maxwell and Sloane accommodate one diameter of syringe and do not have a positive  
85 means of retaining the syringe when filling it.

U.S. Patent 5,487,738 by Sciulli utilizes a base that holds a medicine vial at a 30° angle from horizontal and a syringe holding slide that moves in that base. The syringe is held in the slide and the slide is advanced toward the vial to penetrate the vial seal. In one of the embodiments, a clamping member that clamps over the syringe has a magnifying capability to increase the visibility of the syringe markings. Sciulli does not provide for variations in syringe size.

Another patent in the field is U.S. Patent 6,006,798 by Lindquist. The Lindquist article has a base which has a cavity for the body of a medicine vial, a circular channel for a syringe, a slot between the cavity and channel to receive the vial top, and clips to secure the vial and  
95 syringe. The vial is loaded from the top and the syringe from an end. The clips are hinged to the base and have pins on their free ends that match holes in the base. The pins secure the clips over the vial and syringe. Lindquist is directed to a single syringe and vial size.

U.S. Patent 4,778,454 by LaDow, is a fixture to assist in the loading of a syringe, particularly by a blind person. Similar to Maxwell, LaDow holds the medicine vial while the  
100 syringe is slid along a trough to insert the needle through the seal. However, the unique feature of LaDow is the use of gaged stops to determine how much medicine is drawn into the syringe. The stops are used before the syringe is inserted into the vial to determine how much air is drawn into the syringe. When the syringe is inserted, air is injected into the vial and medicine is drawn into the syringe. The stops are then swung into alignment with the plunger shaft and the plunger  
105 readjusted to that distance. Excess medicine and air are expelled into the vial. To change the volume of medicine, spacer disks must be changed out. Also, LaDow accommodates only one diameter of syringe.

U.S. Patent 6,162,199 by Geringer, discloses a device that accepts a standard medicine vial and a standard syringe in a base and uses the closing of a lid onto the base to move the vial  
110 towards the syringe until the seal is pierced. A secondary needle also pierces the seal to allow air to flow in as medicine is withdrawn into the syringe. The syringe is held securely and tabs within the enclosure engage the syringe plunger, the tabs being used to withdraw the plunger to fill the syringe. Various means are contemplated to improve monitoring of the syringe and vial volumes. Geringer's configuration requires the use of a standard vial and syringe.

115        U.S. Patent 5,377,725 by Neff, emphasizes magnifying the view of a syringe. It has a horizontal base, a lens supporting portion rising vertically from the base, and a horizontal lens. These items together form an elongated "C" having one end partially closed and the other open. The syringe is put sideways into the opening along the device. The lens magnifies the markings on the syringe and the partially closed end separates the body of the syringe and the plunger handle. The vial is inserted in the wholly open end space. Some additional features are a strap to keep the vial aligned, a second, larger, weighted base to which the first base is connected for added stability, and a light source including a battery.

120        There are a few simpler patents in the field. Some provide assistance for coupling a syringe and medicine vials. These are utility patents U.S. Patent 5,554,128 by Hedges and U.S. Patent 5,776,124 by Wald. Similarly, design patent Des. 280,018 by Scott shows a syringe loading guide. For visual assistance, U.S. Patent 4,178,071 by Asbell, and U.S. Patent 4,743,234 by Leopoldi et al. disclose magnifying cylinders that fit over the syringe.

#### **SUMMARY OF THE INVENTION**

130        The present invention is an apparatus to aid in the filling of syringes. It is particularly helpful for syringes used for home administered hypodermic shots by persons having poor eyesight or who have trouble with motor control. The apparatus can accommodate more than one size of syringe and more than one size of medicine vial. The apparatus can even accommodate syringes used in insulin pumps.

135        Accordingly, it is an objective of this invention to assist in the alignment of a hypodermic needle syringe to a medicinal vial. To achieve this objective, this invention may utilize, among other features, a funicular beginning to the syringe accommodating compartment to ease the initial insertion of the syringe.

It is a primary objective of this invention to provide a system whereby an individual with poor hand dexterity or poor motor control can safely and effectively load a syringe with  
140 medication.

It is a further objective of this invention to provide a syringe loading apparatus that is accurate and economical to mass produce.

It is also an objective of this invention to provide a means to control the depth of penetration of the needle into the medicine vial in a syringe loading system.

145 It is another objective of this invention to provide a means for positively locking the syringe into place while withdrawing the piston to fill the syringe.

It is a further objective of this invention to provide a means for magnifying the view of the graduations on the syringe.

It is a still further objective to magnify the view of the medicine vial to accommodate  
150 individuals with poor or reduced eyesight.

It is yet another objective of this invention to provide a changeable means for accommodating several sizes of syringes.

It is still yet another objective of this invention to accommodate several sizes of medicine vials.

155 Yet another objective of this invention is to accommodate several sizes and types of syringes with a single object capable of being repositioned with respect to the medicine vial.

As discussed above, the article of the present invention overcomes the disadvantages inherent in prior art methods and prior art devices for filling a syringe. In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the  
160 invention is not limited in its application to the details of construction and/or to the arrangement

of the support structure set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various and diverse ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purposes of description and should not be regarded as limiting.

165        Accordingly, those skilled in the art will appreciate that the concept upon which this invention is based may readily be utilized as a basis for the design of other structures, methods, and systems for carrying out the purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do depart from the spirit and scope of the present invention.

170        Furthermore, the purpose of the foregoing Abstract is to enable the U.S. Patent and Trademark Office and the public generally, and especially including the practitioners of the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection, the nature and essence of the technical disclosure of the application. The Abstract is neither intended to define the invention of the application, nor is it intended to be limiting to the scope of the invention in any respect.

#### **BRIEF DESCRIPTION OF DRAWINGS**

Fig. 1 illustrates the preferred embodiment of a syringe loading article with lid containing a medicine vial and changeable guide.

180        Fig. 2 shows a multiple aperture guide pivotably associated with the holder containing a medicine vial.

Fig. 3 is an end view of the embodiment shown in Fig. 2.

Fig. 4 shows an interlocking syringe guide and vial box.

Fig. 5 shows an embodiment similar to the preferred embodiment, but the guide uses "V"

grooves instead of apertures.

185 Fig. 6 is an end view showing the alignment of the syringe with the vial.

Fig. 7 shows the stacking of "V" groove guides to accommodate different syringes.

Fig.'s 8 - 12 show an embodiment where "V" grooves of differing depths are located on the sides of a repositionable guide.

#### **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

190 The following discussion illustrates only some of the possible configurations claimed in this invention and should not be interpreted as limiting the scope of the claims. Fig. 1 shows the preferred embodiment of the syringe loading system (10) which assists in guiding a syringe (12) into a medicine vial (14). The syringe guide (10) consist of three major components, a sectioned box (16), a changeable syringe guide member (18), and a lid (24). The changeable syringe guide member (18) has an aperture through it which is slightly larger than the barrel diameter of a syringe (12). A syringe (12) is inserted through this aperture to accurately guide it to a medicine vial (14). The changeable syringe guide member (18) and the lid (24) are made of suitable material to allow the syringe (12) to be observed through the lid (24) and changeable syringe guide member (18) with the lid (24) having its surface (26) shaped so as to provide a magnifying effect so that the readings on the syringe (12) are more easily seen. This magnifying effect in the lid (24) would also provide better viewing of the vial (14). On the changeable syringe guide member (18) are syringe retainers (20) which keep the syringe (12) engaged in the vial (14) while filling the syringe (12).

195

200

To use the syringe guide (10), a person would select a changeable syringe guide member (18) having the correct diameter and length to fit the syringe (12) to be filled, and place the selected changeable syringe guide member (18) in the sectioned box (16). The medicine vial

(14) would then be placed in position in the sectioned box (16) and the lid (24) closed, retaining both the vial (14) and changeable syringe guide member (18). A volume of air equal to the desired amount of medicine would be drawn into the syringe (12) and the syringe (12) inserted

210 through the changeable syringe guide member (18) into communication with the vial (14).

Turning the syringe (12) would engage tabs (22) on the syringe (12) into the syringe retainers (20). The air in the syringe (12) would then be expelled into the vial (14) and medicine drawn into the syringe (12) while reading the volume through the magnifying surface (26) of the lid (24).

215 There are other possible features of this embodiment. One would be a funnel shaped portion at the front of the aperture in the changeable syringe guide member (18) to allow easier insertion of the syringe (12). Another option is interlocking tabs in the changeable syringe guide member (18) and the sectioned box (16) which would insure that the changeable syringe guide member (18) is inserted into the sectioned box (16) in the correct orientation. A third optional  
220 feature is syringe retainers located on the lid (24). This would require closing the lid (24) after the syringe (12) is inserted into the changeable syringe guide member (18). The syringe retainers mounted on the lid (24) would serve the function of the retainers (20) without requiring the turning of the syringe (12) to engage. There are also various common methods in which an object may be mounted on a horizontal or vertical fixed surface such as a wall or table and these  
225 methods could be used with the present invention.

Another claimed embodiment for a syringe loading system (30) is shown in Fig. 2 . The apparatus (30) has a vial box (32) for holding a vial (34) and a revolving syringe guide member (36) rotatably attached to the vial box (32). The revolving syringe guide member (36) has multiple apertures (38) of various diameters to fit syringes of standard sizes. The revolving

230      syringe guide member (36) is made of a material that allows a syringe to be viewed while it is inserted through an aperture (38) and is in communication with a medicine vial (34) and the surface (40) of the revolving syringe guide member (36) near the apertures (38) is shaped so as to provide a magnifying effect to enhance the viewing of a syringe. Fig. 3 shows an end view of this embodiment, the dotted circle (56) showing the outline of a vial placed in the vial box (52).

235      The black dots in the apertures in the revolving syringe guide member (54) show how the needles for various size syringes would align with the vial (56). Each aperture has a magnifying curve (58) associated with it in the surface of the revolving syringe guide member (54).

There are additional features which may be associated with the syringe guide (30) of Fig.

2. The revolving syringe guide member (36) may have retainers associated with each aperture

240      (38) and each aperture (38) may have a funnel shaped opening to facilitate location of the aperture with a syringe (not shown in drawing). Also the exposed end of the revolving syringe guide member (36) may be irregular to accommodate different standard lengths associated with the different standard diameters of syringes (not shown in fringes).

Fig. 4 illustrates an embodiment wherein a vial box (60) holds a medicine vial (62) with

245      the vial box (62) being able to interlock with a syringe guide (64). An external interlocking member (68) on the vial box (60) slides into the recess (70) of the syringe guide (64). An aperture through the syringe guide (64) accommodates a syringe and has an opening (66) which allows a syringe needle to penetrate the medicine vial (62). The interlocking association of the vial box (60) and the syringe guide (64) serve to retain the medicine vial (62). Different syringe guides (64) would have different diameter apertures and different lengths to accommodate different size syringes. This embodiment can incorporate many elements previously discussed such as syringe retainers, funnel shaped beginnings in the guiding apertures and magnifying

shapes and materials for the guide and the box.

Fig.'s 5, 6 & 7 show an embodiment similar to the preferred embodiment wherein a  
255 sectioned box (72) holds a medicine vial (74) to which a syringe (76) is guided by changeable  
syringe guides (78). The changeable syringe guides (78) have V-shaped channels in their surface  
which align syringes (76) of various diameters with the medicine vial (74). Fig.'s 6 & 7 are end  
views wherein the cylinders represent the barrels of different size syringes being aligned with the  
medicine vial (74). The guides (78) may also be stackable as shown in Fig. 7 by the guide (80).

260 This embodiment can also incorporate previously mentioned features such as a magnifying lid  
and syringe retainers.

Fig.'s 8-12 show end views of yet another embodiment. Fig. 9 shows the end view of a  
changeable syringe guide (84) with V-grooves along its sides. The changeable syringe guide (84)  
fits into a segmented box (82) and aligns different size syringes (86) depending on the orientation  
265 of the syringe guide (86). This embodiment can incorporate many of the optional features  
previously discussed as well.